LETTERS TO THE EDITOR.

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The Alleged Destruction of Swallows and Martins in Italy.

I AM naturally adverse to polemics, for I believe that what little time we have can be better employed. And yet, as an old client and reader of NATURE, and as Director of the Italian Bureau of Ornithology, I can hardly allow the several communications on the alleged decrease of swallows and martins and the destruction of small birds in general in Italy, which have appeared in recent numbers of NATURE (see p. 271), to pass without a comment.

That small birds are netted and eaten in this country is a fact which many of us deplore, and we are trying to prevent, or at least to diminish, that kind of destruction with regard to small birds, all of which I consider useful. But as to the Hirundinidæ, no such ruthless destruction as that described by Mr. J. H. Allchin takes place in Italy. To my knowledge no swallow or martin is ever netted in this country, and I confess that I should like to see such birds captured with a fish-hook! I can only ask Mr. Allchin if he candidly believes it possible to catch swallows in great numbers with artificial flies and fish-hooks? I simply do not. In Italy the Hirundinidæ are, besides, the only birds which owe protection to popular belief: in many localities they are considered "the birds of the Madonna," and it is considered unlucky to destroy them. I can assure Mr. Allchin that no decrease of the Hirundinidæ (nor indeed to a certainty of any other small Passerine bird) has been detected in Italy.

Finally, if Mr. Allchin is really desirous of acquiring trustworthy information on the condition of birds in Italy, instead of consulting the newspaper articles of Mr. Stillman, the veracity of whose assertions on such matters may be doubted, or still worse of quoting "Ouida" as an authority on a subject of which she knows nothing, he would do well to betake himself to the library of the British Museum, or to that of the London Zoological Society, and consult the four volumes which by Government commission I have published on the Avifauna of Italy[1]; the three last being the results up to 1891 of an official inquiry on the condition of each species of bird, carefully conducted by trained and experienced observers all over the country. This inquiry is yet going on, and possibly a second report will soon be issued. Mr. Allchin is also evidently misinformed as to the international aspect of the question; at least, so far as Italy is concerned. HENRY H. GIGLIOLI.

R Zoological Museum, the University,
Florence, January 27.

The Hatching of Tuatara Eggs.

IN a memoir on the development of the Tuatara, which I am shortly about to publish, and upon my preliminary notes on which an interesting comment by Mr. G. A. Boulenger, F.R.S., has recently appeared in the pages of this journal (NATURE, vol. lviii. p. 619), I have come to the conclusion that the eggs of this reptile hatch about December of the year following that in which they are laid, and that they thus occupy about thirteen months in their development. Hitherto, so far as I am aware, no specimens have actually been hatched out in captivity, or under direct observation. On December 1, 1898, however, Mr. P. Henaghan, the keeper of the lighthouse on Stephen's Island, brought to my laboratory some eggs which had been recently laid, together with others laid during the previous season. On unpacking the eggs, one of the latter was found to be already hatched, having yielded a fine, active young Tuatara, which is still (December 21) in a state of vigorous health, though it has not been observed to eat anything. On December 8–9 a second specimen hatched out, though I am inclined to think a little prematurely, as a large part of the yolk-sac was still attached. These specimens agree closely with the dead specimens of Stage S. received by me last year, and described in my memoir, but it seems worth while to place on record the actual time of hatching, although the new observations only confirm the conclusions already arrived at. The hatching probably continues throughout the month of December, as the eggs of last season, opened during the last few days, each contain a considerable amount of yolk, together with the very advanced embryo.

A point which seems worthy of attention is the large size of the eggs containing embryos nearly ready to hatch. Two eggs opened on December 17, and containing embryos at Stage S., measured 35 × 27·5 and 32·5 × 26·5 mm. respectively, while recently-laid eggs opened on December 21, and containing embryos of about Stage N., were much smaller, the six measured ranging from 25·5 × 20 to 29 × 22 mm. These observations certainly seem to confirm the opinion of Mr. Henaghan that the eggs swell during development, which I have been at some pains to controvert in my memoir. It must be remembered, however, that the eggs of the Tuatara vary considerably in size.

The eggs nearly ready to hatch are still very tense and turgid. In hatching, the leathery egg-shell appears to be simply torn or split irregularly, probably by the shell-breaker of the young animal. In the recently-hatched animal the nostrils are still plugged up, though the plug appears to be loosening, and after a short while it completely disappears externally.

ARTHUR DENDY.

Christchurch, N.Z., December 21, 1898.

THE afore-mentioned memoir, by my friend Prof. Dendy, has been accepted by Prof. Lankester, F.R.S., for the *Quarterly Journal of Microscopical Science*, and is about to appear in the February number of that journal, to be followed immediately by another on the Pineal Eye; Prof. Lankester having arranged for publication with that generous enthusiasm he extends to all good work. As already announced in these pages, Prof. Dendy sent me last autumn some preserved material for the investigation of the development of the Tuatara's skeleton, and with it half-a-dozen eggs due for hatching about December. The latter were in moist sand packed tight in a tin canister, and were brought by Mrs. Dendy in her cabin, on a voyage to England. Upon delivery they were transferred to a hot-air bath and kept at an approximate temperature of 25° C. One embryo decomposed, and a shell, containing another, having collapsed, was opened by my pupil, Mr. H. H. Swinnerton, who is cooperating with me in the task of investigation. The other four were opened by the enclosed embryos; one prematurely on November 22, the others respectively, and at the full time, on January 14, 19, and 24 of the present year. The embryo which emerged prematurely had a pendant yolk, and was but a centim. shorter than those of Dendy's Stage S. in my possession. The three young ones which remain left the egg with the yolk absorbed, and they continue active and healthy. Although their incubation period would appear to have exceeded that of those hatched out in Prof. Dendy's laboratory, the largest egg-shell measured but 31·5 × 24 mm., the smallest 28·5 × 21 mm. The apparent swelling of the shell, alluded to by Prof. Dendy, had independently arrested the attention not only of both Mr. Swinnerton and myself, but also of our laboratory attendant, George Woodrow, who in December remarked to me that "the eggs seemed rising above the sand"; and the phenomenon would appear to be due to internal tension, no doubt resulting from the actual growth of the enclosed embryo. One of the young ones had just liberated itself as we arrived on the morning of January 24, and we were able to note that on leaving the shell it lay torpid beside it for a period less than an hour, and then with a sudden start ran briskly forward. One of the youngsters, tempted on the day of hatching with a small earth-worm, ran from it affrighted, and by all three meal-worms are still refused. "Bluebottles," however, are eagerly devoured, and upon these all are at present thriving, with every indication of success. Concerning the rupture of the egg-shell, the four shells from which the young in my possession escaped were each cut cleanly, as by a razor, along the long axis. In the case of the prematurely hatched embryo, the incision extended the whole of one side, from pole to pole, while in that of each which went the full time it started short of one pole and extended longitudinally round the other to an approximately corresponding point on the opposite side. In every case the underlying serous envelope was similarly clean cleft, and on examination of the newly-

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[1] E. H. Giglioli, "Avifauna Italica," pp. vii.–626. Firenze, 1886. "Primo Resoconto dei risultati della inchiesta ornitologica in Italia." Parte I., "Avifauna Italica," pp. vii.–706. Firenze, 1889. Parte II., "Avifaune locali," pp. viii.–695. Firenze, 1890. Parte III., "Notizie d'indole generale," pp. vii.–518. Firenze, 1891.

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hatched embryo with its mouth closed, the egg-breaker was seen to form a sharp downwardly directed prominence, projecting freely, and in such a position as to leave little room for doubt that it is the direct agent in rupturing both membrane and shell. It may be added that in the three living specimens in my possession all traces of the egg-breaker have vanished—*i.e.* in that last hatched within seven days. G. B. HOWES.

Royal College of Science, London, January 31.

Attraction in a Spherical Hollow.

THE theorem of attraction stated by Prof. T. Alexander in NATURE of January 19, is a particular case of a more general theorem which I have not seen stated, though very likely it is not new. The well-known theorem of *couches de glissement* is also a case of it. Imagine two spheres, one of radius r and made of positive or attracting matter of density σ, the other of radius r' and made of negative or repelling matter of the same density σ, to coexist even if they overlap. In the space common to the two spheres the one kind of matter neutralises the other, so that the space may be considered as empty. The force on a unit particle of positive matter, placed at any point on the circle of intersection of the two surfaces, is parallel to the line of the centres A, B, of the two spheres and of amount $\frac{4}{3}\pi\sigma\kappa c$ where σ is the common density of the spheres, c the distance between their centres, and κ is the usual attraction constant. For the positive sphere attracts the particle towards the centre with a force $\frac{4}{3}\pi\sigma\kappa r$, and the other sphere repels the particle from its centre with a force $\frac{4}{3}\pi\sigma\kappa r'$. These forces give the resultant $\frac{4}{3}\pi\sigma\kappa c$ parallel to the line joining the centres of the spheres and from the repelling centre towards the other.

This resultant force is independent of the radii of the spheres, provided their centres remain at the same distance apart. It follows that the force at all points within the space common to the two spheres is parallel to the line joining the centres, and has the value just stated. For take any such point P and describe through it spherical surfaces about the centres A, B. The portions of the two spherical distributions which lie outside these surfaces exert no force at P. The spheres internal to P give the force $\frac{4}{3}\pi\sigma\kappa c$.

If one of the spheres is wholly within the other, we have the theorem of the force within a spherical hollow. It is only necessary in that case to suppose the hollow formed by the superposition of negative matter on the previously existing positive matter, and the result follows at once.

I may point out that a theorem similar to and including that stated above holds for two overlapping similar ellipsoids, of equal and opposite densities, and having their corresponding principal axes in the same directions, and one pair of these, say the axis of x of each, in the same line. The centres A, B lie on this line, and any point common to the two ellipsoids will have coordinates x, y, z, say, when referred to axes through A, and x', y, z when referred to parallel axes through B.

Taking, then, as axes of coordinates the principal axes of each ellipsoid, and considering any point in the overlapping portion, and describing through P about A, B as centres two ellipsoidal surfaces S, S′, each similar to the given ellipsoids, we obtain for the components of force on a unit particle due to the positive (say) matter of uniform density σ filling S, the values A_1x, A_2y, A_3z; and for the components of force at the same point due to the negative matter filling S′ the values

$$-A_1x', \ -A_2y, \ -A_3z$$

where A_1, A_2, A_3 are certain integrals which are here constants. The portions of the two ellipsoids external to P exert no force at P. Hence the resultant force on the particle at P is $A_1(x - x')$, that is, it is parallel to the line joining the centres, and proportional to the distance between the centres, and acts from the centre of the repelling towards that of the attracting ellipsoid.

If the coordinates of B, relatively to the axes through A, be a, b, c, so that there is not a pair of corresponding axes in line, the components of force in the overlapping space are A_1a, A_2b, A_3c. The force at every point is $\sqrt{A_1^2a^2 + A_2^2b^2 + A_3^2c^2}$, and is therefore fixed in magnitude and direction.

With reference to the magnetic experiments, it may be recalled that if within a uniformly magnetised ellipsoid there exist a similar ellipsoidal hollow, with its axes parallel to those of the magnetised ellipsoid, the magnetic force within the hollow is zero at every point. A similar result holds, of course, for a sphere. ANDREW GRAY.

Larvæ in Antelope Horns.

I HAVE read with interest the communications of your correspondents on "Larvæ in Antelope Horns" in NATURE of September 15, and also another note on the same subject in *The Entomologist* of July last; but NATURE of June 9, for some reason or other, has not reached me.

As for many years past I have been travelling and residing in Central Africa, have shot large and small game, and have made large collections of the heads of buffalos and antelopes, I have thought that it may be worth while to record my own observations in this matter.

Is it the fact, proved beyond all doubt, that the larvæ in question are those of Lepidoptera and not of Coleoptera?

My own experience is that, unless preventive measures (such as I am about to describe) have been taken in the first instance, the horns of my specimens become infested with the larvæ of what I have hitherto believed to be two small species of *Coleoptera*—the one and smaller of bright metallic-green throughout, the other and larger of dull coal-black above, and white on the underside—which larvæ eat their way up and through the horns, throw out cocoons, and continue doing so until the horns are destroyed, leaving nothing but the cores.

If the heads have been neglected, and left in the open—say either on the ground, or in a tree—the larvæ very soon develop and commence their depredations, all the sooner if the heads have been left with the skin and flesh on.

If, however, these last be removed within a few hours after the animal has been killed, and the bases of the horns and their cores be carefully lathered over with strong arsenical soap where the skin has been cut away from round the horns, and between these and their cores as far up as the hairs of the brush will reach, the larvæ do *not* develop; and heads thus treated, if properly housed, henceforth enjoy absolute immunity from them.

I have a collection of antelopes' heads treated in this way now at Machako's, and though of all ages up to ten months old, there is not a perforation or a cocoon in any one of them; whereas, on the same station, I have noticed that the horns collected by other officers, and not properly cared for, become, most of them, after a time, simply perforated and woolly with cocoons.

Should the larvæ have established themselves, they can readily be killed by pouring paraffin into the horns, and leaving these on end for a day or two so as to retain the oil.

Never once have I remarked these larvæ in the horns of a freshly-killed animal.

I have, however, occasionally found the larvæ of *Diptera* in the flesh of some antelopes—notably so lately in Masailand in the case of a fine male Grant's gazelle, whose body, otherwise in first-rate condition, after being skinned, presented the spectacle of being "flicked" white with larvæ about the size and shape of barleycorns, at intervals of two inches or so.

A propos of the destructive little Coleoptera once more:—

On landing in England from Africa in the spring of 1884, I was at Euston, and amongst my battered and travel-stained baggage on the platform was a large truck-load of buffalos' and antelopes' heads. As I was standing talking to one of my brothers who had come to meet me, an old gentleman, who had been narrowly inspecting the load of heads, suddenly stooped down, and concentrated his gaze on one particular spot: then, fumbling in the pocket of his tail-coat, he produced a pill-box, and dexterously boxed something from one of the buffalo heads. It proved to be one of the green beetles!

Then turning, and realising that I must probably be the owner of the heads, he politely raised his hat and apologised for what he had done, adding that he had taken a species of Coleoptera which—I think he said—was new to him.

I lost no time in assuring him that no apology was necessary, that the obligation lay on my side, not on his!

Mr. Lionel Crawshay, my brother (whose address is Brasenose College, Oxford), can, I think, show you specimens of the green beetle, and possibly of the other as well: if not, I shall be very pleased to send you a series of both; as also, if you wish them, specimens of horns perforated by the larvæ and with their cocoons attached. RICHARD CRAWSHAY.

Simba Camp, British East Africa, November 29, 1898.

P.S.—As an afterthought, I am enclosing you 2 specimens of the green beetle 2 specimens of the black beetle, and 2 larvæ, which I hope will survive the post. R. C.

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